



National Association of Business and Educational Radio

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May 4, 1993

Ralph A. Haller, Chief
Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W.
Washington, D.C. 20554

Re: PR Docket No. 92-235

Dear Mr. Haller:

In response to the Commission's Notice of Proposed Rule Making in PR Docket No. 92-

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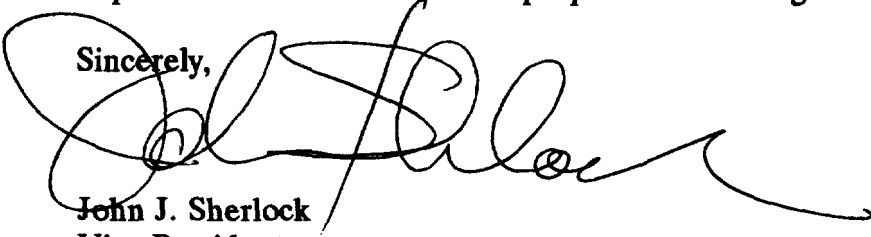
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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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The result of NABER's effort is the attached "White Paper". NABER is filing the White Paper with the Commission at this time in order to provide the Commission and the land mobile industry with sufficient time to completely review the proposal and submit Comments. Therefore, NABER requests that the Commission place the White Paper on Public Notice for the purpose of soliciting such Comments.

Sincerely,



John J. Sherlock
Vice President

NABER WHITE PAPER

Refarming Below 800 MHz

"Bandwidth On Demand"

A Proposal By NABER for Consideration by the Land Mobile Community

Goals

NABER's goals are as follows:

1. Contiguous Spectrum Bands for the Mobile Radio Services
2. Spectrum Efficiency and Increased Capacity
3. Workable Migration Plan
4. Revised Service Pools
5. Streamlined rules
6. Level Playing Field
7. Minimal Disruption of Existing Operations
8. Achievement of Primary Protection for Current Offset Users
9. Establishment of a Home for Low-Power, Non-Site Specific Systems with Low Entry Cost
10. Amortization of Radio Equipment over a Reasonable Life Span of the Equipment
11. Consistency with the Long-Term Budgeting Process of Large Users and Government Users
12. Availability of Spectrum for all Types of Spectrum Efficient Equipment

Recommendations

1. NABER's "Bandwidth On Demand"

NABER promotes the adoption by the Commission of contiguous blocks of spectrum for each user pool (regardless of the number of pools ultimately adopted). This will provide more flexibility in future years to implement new advanced technologies.

The final channel plan should consist of narrowband, contiguous channels of 6.25 kHz (other than paging channels, which will remain 25 kHz), which can be combined by an applicant into a channel of any size bandwidth. As discussed below, an applicant would be required to demonstrate that the requested bandwidth meets the efficiency standard presently being developed by the Telecommunications Industry Association ("TIA"), the Association representing the equipment manufacturers.

It is NABER's belief that the Commission should not favor any one technology over another. A spectrum efficient technology for one type of use may not be efficient for another type of use. The purpose of "slotting" the spectrum into narrowband channels is to enable applicants to request one or more contiguous blocks of channels for a system which suits the individual users' needs. The alternative of setting aside discrete blocks of channels for one type of technology has the disadvantage of limiting the use of one or another technology when a technology block is exhausted. "Slotting" permits a mixture of technologies, without favor to any technology.

For the "slotting", it was necessary to determine the "lowest common denominator" which would permit: (1) natural reductions during the transition phase; (2) single channel use with a spectrum efficient technology; (3) the ability to combine slotted channels for efficient, wide-band technology with minimal wasted bandwidth; and (4) reduce the number of different types of equipment which manufacturers would need to produce. In this regard, if the Commission creates 5 kHz bandwidth channels in the 150 MHz band and 6.25 kHz channels in the 450 MHz band, manufacturers will need to produce two different bandwidth narrowband equipment types. Therefore, NABER believes that the Commission should "slot" the channels in the 150 and 450 MHz bands with the same bandwidth channels.

Although there is considerable sentiment for using a 5 kHz baseline, it is the majority opinion that a 5 kHz channelling plan suffers two deficiencies. First, 5 kHz channel "slots" would prevent 6.25 kHz narrowband equipment from being utilized efficiently. If 5 kHz channels "slots" are utilized, an applicant desiring the use of 6.25 kHz narrowband equipment would need to request two (2) 5 kHz channels, resulting a 3.75 kHz of wasted bandwidth. Under NABER's plan, an applicant desiring the use of 5 kHz bandwidth equipment would receive a 6.25 kHz bandwidth channel. While this appears to result in 1.25 kHz of wasted bandwidth, the substantial problems associated with antenna combining of 5 kHz channels can be substantially reduced by placing the channels slightly farther apart. Second, the transition proposed below for the 450 MHz band would not proceed as smoothly. As proposed below, center channels in the 450 MHz band (where the greatest increase in efficiency can be achieved in this proceeding) can remain the same, with two (2) natural channel splits.

As discussed below, NABER therefore proposes an ultimate 6.25 channel slots in both the 150 MHz and 450 MHz bands at the end of the transition period, with an interim 12.5 kHz step no earlier than 2001. However, by maintaining channel centers, NABER's plan will create an incentive for current users to reduce bandwidth in advance of the benchmark dates.

2. NABER's "Equivalent Efficiency"

NABER promotes the use of an "Equivalent Efficiency" standard. Representatives of TIA have represented to NABER that it is working to develop a standard that can be applied to any technology desired by the user. TIA's standard will be based upon some formula which takes into account factors such as: (1) the size of the service area requested; (2) the amount of spectrum requested; (3) the reliability of the system; and (4) the number of users proposed to serve. An Applicant's "Bandwidth on Demand" would be dependent on meeting this criteria. An applicant could request a wider bandwidth provided that the applicant demonstrates that the efficiency of the proposed wide-band system meets the standard.

Thus, for example, a single, 12.5 kHz bandwidth channel utilizing digital emissions could be granted based upon the applicant's demonstration that the proposed system meets the efficiency standard. Alternatively, another applicant could be granted two (2) 6.25 kHz channels utilizing sideband technology, based upon its demonstration that the system meets the efficiency standard. Multiple channels could be requested for trunking with a similar demonstration.

3. NABER's "Exclusivity For Efficiency"

One problem which has historically plagued the land mobile industry is the tendency of an applicant to "over-engineer" a system. Specifically, applicants often request a larger service area than otherwise needed to serve the applicant's real needs. This decreases spectrum efficiency, as fewer systems can be accommodated on a single channel.

In order to correct this flaw in the assignment system, there are two options. The Commission has proposed to increase the number of systems on each channel, and thereby spectrum efficiency, by restricting the maximum size of an applicant's service area. However, while this option has the potential to increase the number of systems on each channel, the option does not necessarily translate into increased spectrum efficiency. Specifically, where an applicant actually needs a service area greater than permitted by the Commission (but which could be served by a single transmitter site), the applicant will need to apply for multiple stations. The waste of resources and increased cost necessitated by multiple systems (where multiple systems are technically not necessary) is counter-productive to the Commission's goals in this proceeding.

Further, the Commission's option favors private carrier systems and discourages private user systems, as private carriers will be the entity most likely to be able to afford the build-out of a multiple-site system. While there is a tremendous need for

private carrier systems which should be accommodated by the Commission in this proceeding, the Commission must recognize the need for private user systems. Users such as railroads, manufacturing plants and companies such as Federal Express and Yellow Freight must be able to economically install private systems.

NABER believes that the Commission must provide applicants with an incentive to request only that size service area which is necessary. Such an incentive would not only increase spectrum efficiency (by achieving the maximum number of systems per channel which would serve all users needs), but it would also reduce the burden on the Commission and frequency advisory committees, by eliminating the need to determine whether the service area requested matches the technical parameters in the application.

In areas where spectrum is available, NABER proposes that an applicant could achieve channel exclusivity, provided that the applicant meets or exceeds an efficiency/loading factor which NABER has requested be developed by TIA. An applicant requesting the smallest bandwidth and smallest service area would have a lower threshold of units served to achieve exclusivity. Conversely, an applicant requesting wider bandwidth and a larger service area would have a higher threshold of units served to achieve exclusivity. This standard would encourage applicants to use the smallest service area and bandwidth to serve the user's needs, thereby increasing spectrum efficiency.

Thus, for example, an applicant which has communication needs in Southern California could elect to place a single transmitter site atop Mount Wilson. This system, serving a large area with an omnidirectional antenna, would include areas in which the applicant did not truly require communications. Under NABER's proposal, the applicant for this single transmitter site would have a high efficiency/loading threshold to meet to achieve channel exclusivity. Alternatively, the same applicant could request several transmitter sites at lower elevations, serving more tightly controlled service areas, enabling other users to utilize the channel in other areas precluded by the Mount Wilson operation. Under NABER's plan, each smaller transmitter site would have a lower efficiency/loading threshold to meet to achieve channel exclusivity.

4. Contiguous Spectrum

The channeling of the spectrum into 6.25 kHz "slots", while permitting the combining of channels to achieve a 12.5 kHz bandwidth, will not preclude the use of any spectrum efficient technology in development now or in the future. The "slots" would support the use of single sideband, TDMA digital, etc. Contiguous channels within a service pool would ensure that combining of

channels (for larger bandwidths or for technologies such as trunking) could be accomplished with minimal effort.

5. NABER's Migration "Funnel"

NABER is concerned that the Commission's "screwdriver" adjustment, reducing the bandwidth of current radio equipment from 25 kHz to 12.5 kHz would be costly, ineffective and would not achieve the Commission's goals. It is NABER's understanding (from equipment manufacturers) that the "screwdriver" adjustment would increase the noise levels on systems to unacceptable levels. Therefore, NABER suggests that the Commission focus on its long-term spectrum efficiency goal, while providing the easiest transition for users possible.

In deciding on a migration and channeling scheme, the Commission must remember that the spectrum proposed for refarming is used by a wide variety of users, from large railroad systems consisting of hundreds of units (all of which must be able to communicate with each other) to small handheld units costing less than \$200.00, which are often unlicensed. The plan ultimately adopted by the Commission must balance the needs of each type of user. NABER, in developing its plan, has consulted with a wide variety of users. While all users recognize that some sacrifices will be necessary during the transition period, such sacrifices must be in proper relation to the spectrum efficiency achieved.

Two Step Migration. NABER's two-step migration process involves the use of a "funnel" type mechanism which would permit the immediate (but not mandatory) use of narrowband equipment, if desired by the user, in the existing RF environment. This first step would appear to keep the status quo without the increase in number of channels as proposed by the Commission. However, as described below, the "cleaning up" of the land mobile spectrum during Step One should yield additional assignable spectrum and less adjacent channel interference.

a. Step One. Step one involves the discontinuation by the Commission of type acceptance for new, 25 kHz bandwidth analog equipment as soon as practical (with a date to be developed in connection with TIA). It is NABER's understanding that 12.5 kHz equipment can readily be made available. There will need to be a period of time during which users can add 25 kHz units to an existing system, provided users recognize that such systems could operate in wide-band mode for a short period. However, NABER understands that dual mode radios (25 kHz and 12.5 kHz operation) can be produced by equipment manufacturers. Such radios can serve as add-on units for existing systems, and provide narrowband operation immediately for new systems. In the 450 MHz band, two-way channels would now be designated as a maximum of 12.5 kHz bandwidth for new systems.

Applicants for new systems could request no more than 12.5 kHz authorized bandwidth. Renewals for current systems on 450 MHz primary channels would have their licenses conditioned upon a reduction in bandwidth to no more than 12.5 kHz no later than January 1, 2001 (or another suitable time frame). At that time, all offset channels could be considered primary. This will result in significant reduction in interference now experienced in the 450 MHz band between offset and primary channels.

Under this plan, equipment already in the field will have another seven (7) years to be amortized. If users wish to continue using wide-band equipment after this date, the equipment can be used on a secondary basis. This will permit users in less populated areas to continue using wide-band equipment, if desired, in areas where there are few users sharing channels. This would serve as a substitute for the Commission's plan to "phase-in" conversions by market size, since it is difficult to determine what constitutes the proper geographic reach of an urban area or mandate the use of one technology equipment in one area and another technology equipment on the same channel in an adjacent area.

450 MHz offset users, when applying for license renewal (or for a new system), would now specify whether they desire to be a site specific system, or whether they wish to continue non-site specific status. As discussed below, this information is important

standard developed by TIA. Applicants "cleaning up" several channels could immediately request centralized or decentralized trunking.

The immediate impact of Step One - users would: (1)

6. NABER's "Like Services" Consolidation

The reduction to the four (4) proposed services does not address the needs of the end user. Specifically, where there are shared channels, there is a need to ensure compatibility among users. As stated by Congress, representative frequency advisory committees are best able to provide such coordination services. However, maintaining 19 services is burdensome and results in inefficient, time consuming and more costly assignments of licenses to users.

The most beneficial system is to consolidate "like" users either by operations or by the underlying business use of the applicant/licensee. The following consolidation of pools is proposed:

- i. Public Safety: Local Government, Police, Fire, Highway Maintenance, Forestry Conservation, Emergency Medical
- ii. Industrial I: Forest Products, Motion Picture, Special Industrial, Telephone Maintenance, Relay Press
- iii. Industrial II: Utilities, Petroleum, Manufacturers

that only private carriers are willing to invest the capital to create these multi-site systems. The power reduction proposed appears to contradict the Commission's stated goal of ensuring that the right to operate as a private system is retained. With the potential increased cost to establish or re-engineer a system with multiple sites, the right to operate a private system is available but exercising the right may be beyond the economical reach of most smaller users. Also, this proposal does not take into account that additional tower structures may be required to be constructed to cover the current area of operations of many systems. It may be very difficult for users to obtain federal, state, and local approval for new sites to build the additional tower sites.

NABER's recommendation is to establish three different power level categories within each service pool. Specifically, there should be a certain number of channels set aside for: (1) high power systems with operational parameters similar to today's environment; (2) low power, site specific systems with a need for on-site use at permanent locations; and (3) low power, non-site specific systems with a need for on-site use at non-permanent locations. With the ability to "engineer-in" numerous systems on the low power, site-specific frequencies, the number of systems per frequency can be maximized, without geographic gaps of unusable spectrum between systems which exists in the 800 MHz band. This will also minimize interference between co-channel systems. Further, NABER supports the proposed power limitations (based upon service area) proposed by the Land Mobile Communications Council ("LMCC").

As explained above, users will have an incentive to use the lowest power possible, since a smaller service area will enable the user to more easily achieve channel exclusivity. Therefore, the problem in the past of overpowered systems will be eliminated.

8. 150 MHz Common Carrier Channels

The 150 MHz band is characterized by numerous service categories (both private and common carrier) with small pieces of allocated spectrum, with few "pieces" contiguous. In order for the 150 MHz band to achieve the channel capacity increase desired by the Commission, the Commission may wish to include the 150 MHz common carrier channels in its "refarming" plan. By including such channels, contiguous spectrum in discrete pools described above can be achieved.

9. Elimination of Community Repeaters

NABER supports the elimination of community repeaters, provided existing systems are grandfathered (as proposed) and system operators have the option of converting the system to

private carrier status and being designated at Step 2 for use of a two-way private carrier channel.

10. Innovative Shared Use Proposal ("ISU")

NABER opposes the ISU proposal, as it needlessly robs the 150 MHz band of contiguous spectrum, with no benefits. By permitting trunking, combining of channels, etc., the same purpose is accomplished.